



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Atty. Docket: FINKELSTEIN=1

In re Application of: ) Conf. No.: 6641  
Alexander FINKELSTEIN et al. )  
Appln. No.: 10/585,582 ) Art Unit: 2891  
Filing Date: July 10, 2006 ) Examiner: M. L. REAMES  
For: DEVICE AND METHOD FOR ) Washington D.C.  
MANIPULATING DIRECTION OF )  
MOTION OF CURRENT CARRIERS) November 20, 2006

INFORMATION DISCLOSURE STATEMENT [IDS]

Honorable Commissioner for Patents  
U.S. Patent and Trademark Office  
Customer Service Window  
Randolph Building, Mail Stop Amendment  
401 Dulany Street  
Alexandria, VA 22314

Sir:

This Information Disclosure Statement is submitted in accordance with 37 CFR §§1.97, 1.98, and it is requested that the information set forth in this statement and in the listed documents be considered during the pendency of the above-identified application, and any other application relying on the filing date of the above-identified application or cross-referencing it as a related application.

1. This IDS should be considered, in accordance with 37 CFR §1.97, as it is filed before the mailing date of a first office action on the merits or before the mailing of a first Office action after the filing of a Request for Continued Examination under 37 CFR §1.114.

2. In accordance with 37 CFR §1.98, this IDS includes a list (e.g., form BN/SB/08A/B) of all patents, publications, or other information submitted for consideration by the office, either incorporated into this IDS or as an attachment hereto.

Other than U.S. patent(s) and/or published U.S. application(s), which 37 CFR §1.98(a)(2)(ii) does not require to be filed unless specifically required by the Office, a copy of each document listed is attached.

3. No explanation of relevance is necessary for documents in the English language (see reply to Comments 67 and 68 in the preamble to the final rules; 1135 OG 13 at 20).

4. Other information being provided for the examiner's consideration follows:

International Search Report mailed September 22, 2006.

5. In accordance with 37 CFR §§1.97(g) and (h), the filing of this IDS should not be construed as a representation that a search has been made or that information cited is, or is considered to be, material to patentability as defined in 37 CFR §1.56(b), or that any cited document listed or attached is (or constitutes) prior art. Unless otherwise indicated, the date of publication indicated for an item is taken from the face of the item and Applicant reserves the right to prove that the date of publication is in fact different.

Respectfully submitted,

BROWDY AND NEIMARK  
Attorneys for Applicant(s)

By:



Sheridan Neimark  
Registration No. 20,520

SN:ma  
624 Ninth Street, N.W., Suite 300  
Washington, D.C. 20001-5303  
Telephone: (202) 628-5197  
Facsimile: (202) 737-3528  
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INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT

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of

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## Complete if Known

Application Number	10/585,582
Filing Date	July 10, 2006
First Named Inventor	Alexander FINKELSTEIN
Group Art Unit	2891 Confirmation No. 6641
Examiner Name	Matthew L. REAMES
Attorney Docket Number	FINKELSTEIN=1

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
AA	US- 6,355,953 B1		03-12-2002	George KIRCZENOW	
AB	US-203/0075772 A1		04-24-2003	Alexander EFROS et al.	
	US-				
	US-				
	US-				

## NON PATENT LITERATURE DOCUMENTS /OTHER INFORMATION

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
	AC	S. A. WOLF et al., "Spintronics: A Spin-Based Electronics Vision for the Future", <u>SCIENCE</u> , Vol. 294, pp. 1488 - 1495, November 16, 2001	
	AD	H. OHNO et al., "Semiconductor Spin Electronics", <u>JSAP International</u> , Mo. 5, pp. 4-13, January 2002.	
	AE	Gary PRINZ, "Magnetoelectronics", <u>SCIENCE</u> , Vol. 282, pp. 1660-1663, November 27, 1998.	
	AF	Mark JOHNSON et al., "Interfacial Charge-Spin Coupling: Injection and Detection of Spin Magnetization in Metals", Vol. 55, No. 17, pp. 1790-1793, October 21, 1995.	
	AG	R. FIEDERLING et al., "Injection and Detection of a spin-polarized current in a light-emitting diode", <u>NATURE</u> , Vol. 402, pp. 787-789, December 16, 1999.	
	AH	Y. OHNO et al., "Electrical spin injection in a ferromagnetic semiconductor heterostructure". <u>NATURE</u> , Vol. 402, pp. 790-792, December 16, 1999.	
	AI	Vladimir Ya. KRAVCHENO et al., "Spin inection into a ballistic semiconductor microstructure", <u>Physical Review B</u> , Vol. 67, pp. 121310-1 - 121310-4, 2003.	
	AJ	G. F. DRESSELHAUS, "Spin-Orbit Coupling Effects in Zinc Blende Structures", <u>Physical Review</u> , Vol. 100, No. 2, pp. 580-586, October 15, 1955.	
	AK	E. I. RASHBA, "Properties of Semiconductors with an Extremum Loop I. Cyclotron and Combinatorial Resonance in a Magnetic Field Perpendicular to the Plane of the Loop", Soviet Physics - Solid State, Vol. 2, pp. 1109-1122, June 1960.	
Examiner Signature		Date Considered	

\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kind Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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Group Art Unit	2891	Confirmation No. 6641
Examiner Name	Matthew L. REAMES	

Attorney Docket Number FINKELSTEIN=1

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	AL	Yu A. BYCHKOV et al., "Oscillatory effects and the magnetic susceptibility of carriers in inversion layers", <u>J. Phys. C. Solid State Phys.</u> , Vol. 17, pp. 6039-6045, 1984.	
	AM	J. LUO et al., "Effects of inversion asymmetry on electron energy band structures in GaSb/InAs/GaSb quantum wells", <u>Phys. Review B</u> , Vol. 41, No. 11, pp. 7685-7693, April 15, 1990.	
	AN	Simon M. SZE, "Semiconductor Devices: Physics and Technology", <u>Wiley Text Books</u> , 2 <sup>nd</sup> Edition, pp. 246-253 and 332-368, September 2001.	
	AO	Y. SATO et al., "Large spontaneous spin splitting in gate-controlled two-dimensional electron gases at normal $In_{0.75}Ga_{0.25}As/In_{0.75}Al_{0.25}As$ heterojunctions". <u>Journal of Applied Physics</u> , Vol 89, No. 12 pp. 8017-8021, June 15, 2001.	
	AP	P. M. MORSE et al., "Methods of Theoretical Physics I", Chapter 12.2 Distribution Functions for Diffusion Problems, pp. 1606-1638, June 1953.	
	AQ	Igor ZUTIC et al., "Spintronics: Fundamentals and applications", <u>Review of Modern Physics</u> , Vol. 76, pp. 323-410, April 2004.	
	AR	A. A. KISELEV et al., "T-shaped spin filter with a ring resonator", <u>Journal of Applied Physics</u> , Vol. 94, No. 6, pp. 4001-4005, September 15, 2003.	
	AS	A. A. KISELEV et al., "T-shaped ballistic spin filter", <u>Applied Physics Letters</u> , Vol. 78, No. 6, pp. 775-777, February 5, 2001.	
	AT	Sanker Das. SARMA, "Spintronics", <u>American Scientist</u> , Vol. 89, pp. 516, November 2001.	
	AU	I. I. RABI, "Space Quantization in a Gyrating Magnetic Field", <u>Physical Review</u> , Vol. 51, pp. 652-654, April 15, 1937.	
	AV	J. SPECTOR et al., "Control of ballistic electrons in macroscopic two-dimensional electron systems", <u>Appl. Phys. Letters</u> , Vol. 56, No. 10, pp. 967-969, March 5, 1990.	

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SignatureDate  
Considered

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Substitute for form 1449A/PTO				Complete if Known	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>				Application Number	10/585,582
(use as many sheets as necessary)				Filing Date	July 10, 2006
				First Named Inventor	Alexander FINKELESTEIN
				Group Art Unit	2891 Confirmation No. 6641
				Examiner Name	Matthew L. REAMES
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Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published				T <sup>2</sup>
	AW	L. W. MOLENKAMP et al., "Electron-beam collimation with a quantum point contact", <u>Physical Review B</u> , Vol. 41, No. 2, pp. 1274-1277, January 15, 1990.				
	AX	Yu A. BYCHKOV et al., "Properties of a 2D electron gas with lifted spectral degeneracy", <u>JETP Letters</u> , Vol. 39, No. 2, pp. 78-81, January 25, 1984.				
	AY	S. DATTA et al., "Electronic analog of the electro-optic modulator", <u>Applied Physics Letters</u> , Vol. 56, No. 7, pp. 665-667, February 12, 1990.				
	AZ	J. LUO et al., "Observation of the zero-field spin splitting of the ground electron subband in GaSb-In-As-GaSb quantum wells", <u>Physical Review B</u> , Vol. 38, No. 14, pp. 10142-10145, November 15, 1988.				
	BA	B. DAS et al., "Evidence for spin-splitting in In <sub>x</sub> Ga <sub>1-x</sub> As/In <sub>0.52</sub> Al <sub>0.48</sub> As heterostructures as B→0", <u>Physical Review B</u> , Vol. 39, No. 2, pp. 1411-1414, January 15, 1989.				
	BB	J. NITTA et al., "Gate Control of Spin-Orbit Interaction in an Inverted In <sub>0.53</sub> Ga <sub>0.47</sub> As/In <sub>0.52</sub> Al <sub>0.48</sub> As Heterostructure", <u>Physical Review Letters</u> , Vol. 78, No. 7, pp. 1335-1338, February 17, 1997.				
	BC	G. ENGELS et al., "Experimental and theoretical approach to spin splitting in modulation-doped In <sub>x</sub> Ga <sub>1-x</sub> As/InP quantum wells for B→0", <u>Physical Review B</u> , Vol. 55, No. 4, pp. R1958-R1961, January 15, 1997.				
	BD	S. J. PAPADAKIS et al., "Spin-splitting in GaAs two-dimensional holes", <u>Physica E</u> , Vol. 9, pp. 31-39, 2001.				
Examiner Signature				Date Considered		

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